

## CLAIMS

What is claimed is:

1. A compressor comprising:

a housing;

a first rotor held by the housing for rotation about a first axis; ;

a second rotor held by the housing for rotation about a second axis;

a third rotor held by the housing for rotation about a third axis;

a first compression path having suction and discharge ends; and

a second compression path, independent of the first compression path and having suction and discharge ends,

wherein at least one of:

the discharge end of the first compression path is at a different pressure than the discharge end of the second compression path; and

the suction end of the first compression path is at a different pressure than the suction end of the second compression path.

2. The compressor of claim 1 wherein:

the first compression path is associated with the first rotor and the second rotor; and

the second compression path is associated with the first rotor and the third rotor.

3. A cooling system including the compressor of claim 1 and further comprising:

at least one condenser;

at least one expansion device;

at least one evaporator; and

a plurality of conduits coupling the compressor, the at least one condenser, the at least one expansion device, and the at least one evaporator so as to define first and second at least partially separate circuits respectively associated with the first and second compression paths.

4. The cooling system of claim 3 wherein:

the discharge end of the first compression path is at the same pressure as the suction end of the second compression path.

5. The apparatus of claim 4 further comprising:

a first condenser;

a first expansion device;

a first evaporator; and

one or more first conduits coupling the first condenser, the first expansion device and the first evaporator to the housing to define a first flowpath from the discharge end of the second compression path to the suction end of the first compression path.

6. An apparatus comprising:

a housing;

a first rotor held within the housing for rotation about a first axis;

a second rotor enmeshed with the first rotor and held within the housing for rotation about a second axis; and

a third rotor enmeshed with the first rotor and held within the housing for rotation about a third axis,

wherein:

the housing comprises:

a first surface cooperating with the first and second rotors to define a first inlet port;

a second surface cooperating with the first and second rotors to define a first outlet port;

a third surface cooperating with the first and third rotors to define a second inlet port; and

a third surface cooperating with the first and third rotors to define a second outlet port; and

at least one of: the first and second inlet ports are at a different pressure than each other; and the first and second outlet ports are at a different pressure than each other.

7. The apparatus of claim 6 further comprising:

a first condenser;

a first evaporator;

one or more first conduits coupling the first condenser and the first evaporator to the housing to define a first flowpath from the first outlet port through the first evaporator and first condenser and to the first inlet port;

a second condenser;

a second evaporator; and

one or more second conduits coupling the second condenser and the second evaporator to the housing to define a second flowpath from the second outlet port through the second evaporator and second condenser and to the second inlet port.

8. The apparatus of claim 6 wherein:

the first outlet port is at the same pressure as the second inlet port.

9. The apparatus of claim 8 further comprising:

a first condenser;

a first expansion device;

a first evaporator; and

one or more first conduits coupling the first condenser, the first expansion device and the first evaporator to the

housing to define a first flowpath from the second outlet port to the first inlet port.

10. The apparatus of claim 9 wherein:  
there are no economizer branches off the first flowpath.
11. The apparatus of claim 9 further comprising:  
an economizer heat exchanger having:  
    a first leg along the first flowpath; and  
    a second leg, in heat exchange relation with the first leg, the second leg being along a diversion flowpath from a location along the first flowpath between the first condenser and the first leg to join a second flowpath from the first outlet port to the second inlet port.
12. The apparatus of claim 6 wherein either:  
the first and second inlet ports are at like pressure; or  
the first and second outlet ports are at like pressure.
13. The apparatus of claim 6 wherein either:  
the first and second inlet ports form a common inlet port; or  
the first and second outlet ports form a common outlet port.
14. The apparatus of claim 6 wherein:  
the first rotor is a male rotor; and  
the second and third rotors are female rotors.
15. An apparatus comprising:  
a first rotor held for rotation in at least a first direction about a first axis;

a second rotor enmeshed with the first rotor and held for rotation about a second axis;

a third rotor enmeshed with the first rotor and held for rotation about a third axis; and

means cooperating with the first, second, and third rotors for providing

a first volume index associated with interaction of the first and second rotors when the first rotor is driven in the first direction; and

a second volume index associated with interaction of the first and third rotors when the first rotor is driven in the first direction, the second volume index different from the first volume index.

16. The apparatus of claim 15 in combination with first and second refrigerant flows along non-intersecting first and second flowpaths through the apparatus.

17. The apparatus of claim 15 in combination with first and second refrigerant flows along first and second flowpaths through the apparatus intersecting at a suction side of the apparatus.

18. The apparatus of claim 15 in combination with first and second refrigerant flows along first and second flowpaths through the apparatus intersecting at a discharge side of the apparatus.